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Agile-Based Academic Information System Development for Efficient Assessment at Al-Ma'rifah Boarding School

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Abstract

Advances in information technology provide great opportunities to increase the efficiency of managing academic data in educational institutions, including the Al-Ma'rifah Islamic Boarding School, which has been managing data manually and facing various obstacles such as recording errors, limited data access, and time inefficiency. This research develops an Academic Information System (AIS) based on the CodeIgniter framework with Agile methodology, which allows iterative system development by involving users to ensure needs are met. This system is designed to include student data management features, lesson schedules, UTS and UAS scores, as well as academic reports, using an MVC structure to increase speed, scalability and ease of use. Research data was obtained through observation and interviews with admin and teachers, supported by internal Islamic boarding school documents. The results show that Agile-based AIS is able to increase data management efficiency by up to 70%, reduce recording errors by 60%, and speed up data processing by up to 50%. This system also makes it easier to access academic information, increases transparency, and supports more structured data management. With intuitive navigation and integrated features, this system has received positive responses from users, becoming an effective modern solution to support academic management at Al-Ma'rifah Islamic Boarding School.

Keywords: *Academic Information System Agile Methodology, CodeIgniter MVC Framework, Data Management Efficiency, Islamic Boarding School Data Management.*

1. Introduction

In the world of education, the application of technology allows institutions to manage academic data more efficiently and accurately, especially through integrated academic information systems [1]. Academic Information Systems (AIS) are a solution for optimizing data management in educational institutions, including in Islamic boarding school environments which have special characteristics and needs [2]. At Al-Ma'rifah Islamic Boarding School, academic data management is still manual and not integrated, causing inefficiency, prone to errors, and limited transparency in assessments and information for students and student guardians. Therefore, the use of Agile methodology, which is known to be able to produce systems that are responsive and according to needs, has the potential to overcome this obstacle [3].

2. Research Methods

This research uses qualitative methods to analyze needs and evaluate the effectiveness of the information system at Al-Ma'rifah Islamic Boarding School. Data was collected through user interviews and observations, while system development applied Agile methodology by utilizing the Apache and MySQL server packages in the XAMPP application [4]. The system is designed to store student data, teacher data, lesson schedules, and UTS and UAS scores, equipped with a CRUD (Create, Read, Update, Delete) feature for data management [5]. However, the teacher's role is limited to only inputting UTS/UAS scores and viewing the lesson schedule.

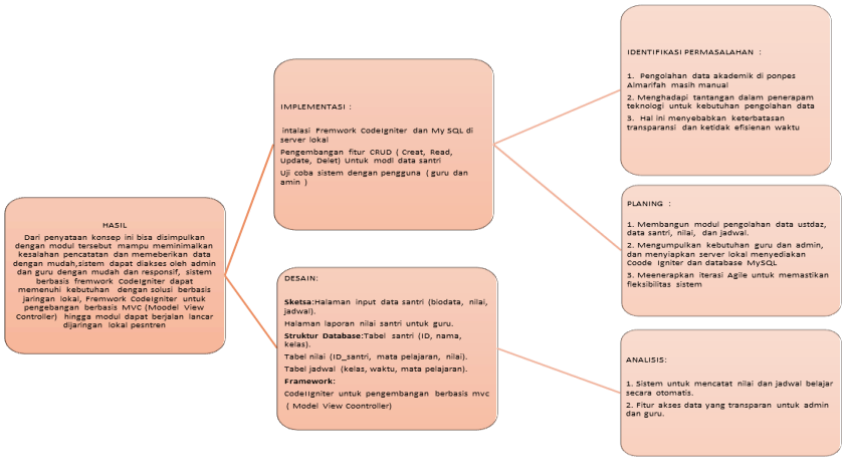

Figure 1: Stages Of Research Methods

2.1. Data Source

This research uses primary and secondary data as sources of information. Primary data was collected through observation and interviews to understand the academic data management process, including a review of the Standard Operating Procedures (SOP) implemented [6]. Meanwhile, secondary data includes internal documents such as reports, grade formats, schedules, as well as references from scientific articles and research related to educational information systems. Evaluation is carried out to ensure the validity, reliability and quality of the data used, both from primary and secondary sources, as well as ensuring the data collected is relevant to the research objectives to avoid bias or unnecessary information.

3. Results and Discussion

3.1. Existing Bussines Process Anaysis

The system used at the Al-Ma'rifah Islamic Boarding School is currently still manual, where academic data management is carried out by each teacher without a centralized admin. Student and teacher data are recorded in spreadsheets or notebooks, while book data are recorded manually by teachers in their respective books. Teaching schedules are made manually, and students' grades are recorded manually with the potential for errors and delays. In addition, academic reports are prepared manually, which often results in inaccurate calculations and delays in completion.

3.2. Usicase Diagram

Based on the analysis of old business processes, a new business process was developed to make it easier to manage teacher, student, book and grade data in one system. This system is expected to save time, prevent data loss, and make it easier to search and record values. This new business process is depicted in a use case diagram with a scenario explanation as follows:

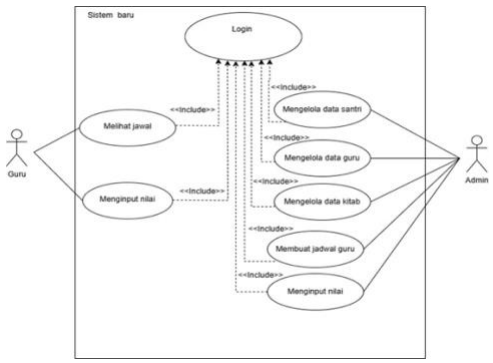

Figure 2: Use Case New System Process Diagram

3.3. Scenario Use Case Diagram

The use case diagram scenario is used to describe the workflow which includes the admin login use case, teacher login, teacher data management, student data management, lesson schedule, student grades, teacher schedule, and teacher grade management.

3.4. Activity Diagram

Activity diagrams depict the flow of system functionality, showing business workflows or event flows [7]. In the academic system, there are several activity diagrams, such as the admin login and teacher login. In the Admin Login Activity Diagram, the admin logs in to the

system, if successful, can access the main menu; if it fails, the system will return the admin to the login page. Likewise in the Teacher Login Activity Diagram, the teacher logs in to the system, if successful, can access the main menu, but if the login fails, the system will return the teacher to the login page.

3.5. Squence Diagram

Sequence diagrams depict dynamic collaboration between objects in a system, showing the sequence of messages sent between objects and the interactions between them [8]. This diagram is used to describe interactions in processes such as admin login, teacher login, student data management, teacher data management, lesson schedule, student grades, teacher schedule, and teacher grade management.

3.6. Design Interface

Page display interface design that will be created on the system, there are several page designs for the Al-Ma'rifah Islamic Boarding School academic information system including:

a. Login Display
The login display design is used to validate admins and teachers who want to access the system, by asking for a username and password. If an error occurs, the system will display an error message.

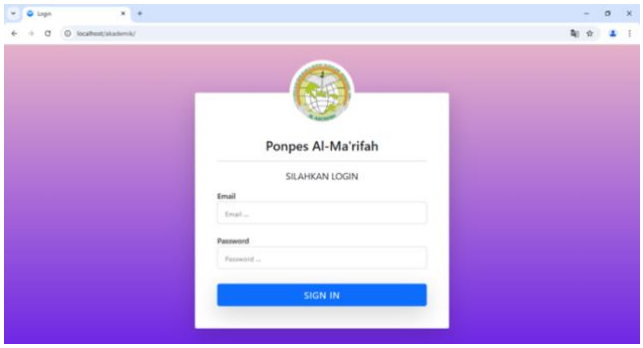

Figure 3: Login Menu Display

b. Teacher Data Menu
The teacher data menu allows admins to edit, save and delete teacher data after logging into the system.

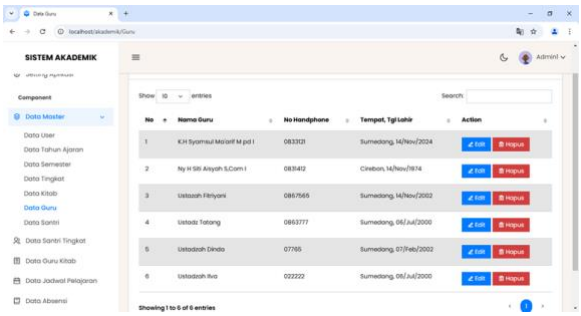

Figure 4: Teacher Data Menu Display

c. Student Data Menu
The design of the student data menu is a menu that can be accessed by the admin after logging into the system and selecting the student data option. In this menu, the admin has the ability to edit, save and delete student data.

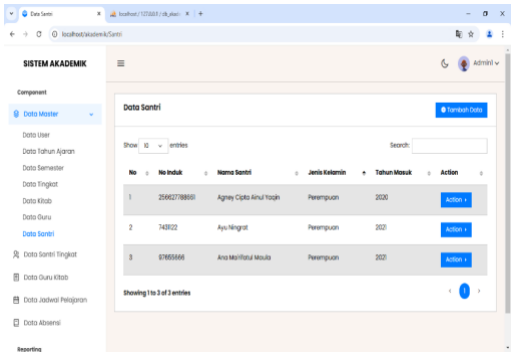

Figure 5: Student Data Menu Display

d. Schedule Menu
The schedule data menu design is a menu that is accessed by the admin after logging into the system and selecting schedule data. In this schedule data menu the admin can edit, save and delete schedule data.

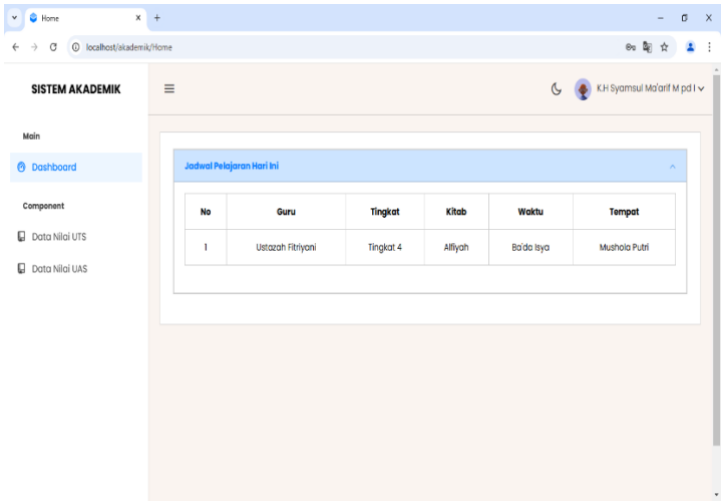

Figure 6: Schedule Menu

e. Value Menu

The value data menu design is a menu that is accessed by the admin after logging in to the system and selecting UTS/UAS value data. In this value data menu the admin can print data but not input value data because that is the teacher's right, but can back up all data.

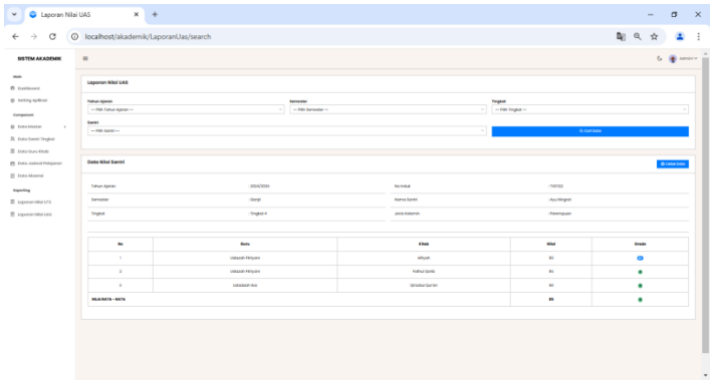

Figure 7: Value Menu

f. Menu Input Nilai Untuk Guru

The design of the teacher actor score data menu is a menu that is accessed by the teacher after logging in to the system and selecting UTS/UAS score data. In this score data menu the teacher can edit, delete, save UTS/UAS score data by searching for student level, academic year and last semester input the appropriate grades.

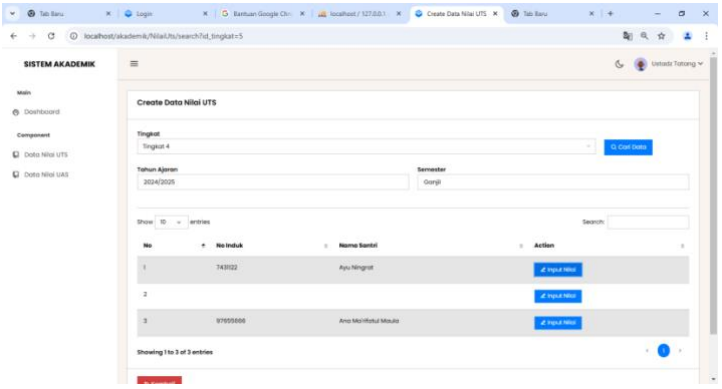

Figure 8: Value Input Menu For Teacher

3.7. Deployment

Deployment is carried out using XAMPP to place web applications locally with Apache and MySQL servers [9]. The application is stored in the htdocs folder, while the database is managed via phpMyAdmin. Apache handles HTTP requests, MySQL manages the database, and an Asus PC is used to run XAMPP. Once the application is deployed, developers can test it via the browser on http://localhost.

3.6. System Test Results

Black box testing, also known as black box testing, is a type of testing used to evaluate whether the output produced by the system is as expected [10]. The following are the results of black box testing on the Al-Ma'rifah Islamic Boarding School academic system:

Tabel 1: Black Box Testing

No	Test Case	Expected Result	Actual Result	Conclusion	No
1.	Login with admin account and click login	Email: admin@gmail.com Password: Admin	System displays successful login	As expected	1.
2.	Login with incorrect admin account and click login	Email: admin@gmail.com Password: admin123	System displays error: incorrect email/password	As expected	2.
3.	Login with teacher account and click login	Email: guru@gmail.com Password: Guru	System displays successful login	As expected	3.
4.	Click on add teacher data menu	Name: Ustadzah Adel Phone: 085314566771 Place of Birth: Sumedang Date of Birth: 06/07/2006 Address: Sumedang Ranca Kalong	System displays success message: data saved, and added teacher is displayed	As expected	4.
5.	Click on add student data menu	Student ID: 7431122 Name: Ayu Ningrat Gender: Female Place of Birth: Ciamis Nationality: Indonesian Date of Birth: 06/07/2002 Enrollment Year: 2021 Father's Name: . Mother's Name: Tarmi Parent's Phone: 0766666 Sibling Number: 6 Siblings: 7 Address: Ciamis	System displays success message: data saved, and added student is displayed	As expected	5.
6.	Click on add schedule menu	Name: Ustadzah Fitriyani Book Name: Fathul Qorib Time: After Isya Place: Mushola Putri Level: 4 Day: Monday	System displays success message: data saved, and added schedule is displayed	As expected	6.
7.	Click to search UTS score data	Academic Year: 2024/2025 Semester: Odd Level: 4 Student: Ayu Ningrat	Displays UTS score data	As expected	7.
8.	Click to search UAS score data	Academic Year: 2024/2025 Semester: Odd Level: 4 Student: Ayu Ningrat	Displays UAS score data	As expected	8.

4. Conclusion and Suggestions

Based on the research results, entitled "Development of an Agile-Based Academic Information System for Efficient Assessment at the Al-Ma'rifah Islamic Boarding School" has the main conclusion regarding the application of the Agile methodology making the development of a flexible system, by actively involving users (admins and teachers) in every stage [11]. These results guarantee that the final system meets the requirements of interest in Islamic educational institutions. The evaluation results show that this system increases the efficiency of data management and reduces recording errors, providing a positive impact on the quality of academic management in Islamic boarding schools.

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